

CLAIMS

1. A filter device for filtering out impurities, comprising:
a filter element made of resin, for filtering out the impurities; and
a container made of resin, which houses the filter element,
5 wherein the filter element is joined to the container.

2. The filter device according to claim 1, wherein the filter element is
joined to the container by resin welding.

3. The filter device according to claim 2, wherein the welding is hot
plate welding.

10 4. The filter device according to claim 2 or 3, wherein the filter
element has an end directly fixed by welding to an inner wall surface of the
container.

5. The filter device according to claim 4, wherein the filter element is
fixed in a folded form having a plurality of pleats.

15 6. The filter device according to claim 4 or 5, wherein
the filter element is fixed to the container of which the resin forming the
inner wall surface having been melted, permeating into the filter element, and
solidified therein.

7. The filter device according to any one of claims 4 to 6, wherein a
20 welded part of the filter element and the inner wall surface is formed in a
narrow strip shape.

8. The filter device according to claim 7, wherein the inner wall
surface of the container is provided with a groove formed in each end of the
weld part in a longitudinal direction so that the melted resin squeezed out
25 from the welded part is received in the groove.

9. The filter device according to claim 7 or 8 further comprising a
protrusive rib formed on the inner wall surface of the container to isolate the
welded part of the filter element and the inner wall surface from a filtering

part of the filter element.

10. The filter device according to any one of claims 1 to 9, wherein the container is of a C-shape or I-shape in cross section.

11. The filter device according to any one of claims 1 to 10, wherein
5 the container is constituted of a combination of a plurality of container components including a first container component to which the filter element is joined and a second container component which is joined to the first container component, and

the second container component and the filter element are joined to the
10 first container component at the same time.

12. The filter device according to claim 11, wherein the first container component is a container body and the second container component is a cover joined to the container body, and

the cover is welded to the container body and the filter element is fixed
15 by welding to the cover so that an end of the filter element is embedded in the cover.

13. The filter device according to claim 12, wherein

when the filter element is of a folded form having the plurality of pleats, an end of the filter element in a direction substantially perpendicular to a
20 folding direction is fixed by welding to the cover so that the end is embedded in the cover.

14. The filter device according to claim 12 or 13, wherein

the filter is fixed to the cover of which the resin forming the inner surface having been melted, permeating into the end of the cover, and solidified
25 therein.

15. A manufacturing method of a filter device comprising a filter element for filtering out impurities and a container made of resin which houses the filter element, comprising the steps of:

melting an inner wall surface of the container to generate a melted resin;
 allowing the melted resin to permeate into the filter element; and
 solidifying the melted resin having permeated into the filter element to
 fix the filter element to the container.

5 16. The manufacturing method of a filter device according to claim 15,
 further comprising, when the container made of resin which houses the filter
 element is constructed of a container body and a cover, the steps of:

melting the inner surface of the cover to generate the melted resin;

10 melting a portion of the container to be joined to the cover to generate a
 melted resin; and

joining the cover to the container by welding to fix an end of the filter
 element housed in the container to the inner surface of the cover so that the
 end is embedded in the melted resin of the inner surface of the cover.

17. A fuel supply system comprising:

15 a filter device configured according to any one of claims 1 to 14;

a fuel reservoir for reserving fuel; and

a fuel pump for supplying the fuel to the filter device by sucking the fuel
 from the fuel reservoir,

which are assembled in modules.